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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/696,813	10/25/2000	Apostolos Voutsas	SLA 0468	3618

7590 01/06/2004

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EXAMINER

NGUYEN, KHIEM D

ART UNIT PAPER NUMBER

2823

DATE MAILED: 01/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/696,813

Applicant(s)

VOUTSAS ET AL.

Examiner

Khiem D Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 12 and 20-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 12 and 20-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 October 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Response to Amendment

Response to Arguments

Applicant's arguments with respect to claims 1-8, 12 and 20-22 have been considered but are moot in view of the new ground(s) of rejection.

New Grounds of Rejection

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1-4, 7, 12, and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Yamazaki et al. (U.S. Pub. 2002/0207502).

In re claim 1, **Yamazaki** discloses a method of fabricating a polysilicon film, comprising the steps of: providing a substrate (**FIGS. 5A-B: 501 and FIGS. 6A-B: 601**); depositing an amorphous silicon film (**FIGS. 5A-B: 503 and FIGS. 6A-B: 603**) on the substrate by the process of physical vapor deposition (sputtering) (page 6, paragraph [0107] and page 8, paragraph [0156]); introducing a metal catalyst (**FIGS. 5A-B: 504 and FIGS. 6A-B: 606**) to the previously deposited amorphous silicon film (page 6, paragraph [0108] and page 8, paragraph [0156]); and annealing the amorphous silicon

film to form a crystallized region by pure metal induced crystallization (page 6, paragraph [0110] and pages 8 and 9, paragraph [0157]).

In re claim 2, Yamazaki discloses irradiating the crystallized region with an excimer laser after the step of annealing the amorphous silicon film (page 6, paragraph [0113] and page 16, paragraph [0304]).

In re claim 3, Yamazaki discloses the step of fabricating a thin film transistor in the crystallized region (page 6, paragraph [0111] and page 9, paragraph [0161]).

In re claim 4, Yamazaki discloses the step of utilizing the crystallized region in a liquid crystal display (page 13, paragraph [0257]).

In re claim 7, Yamazaki discloses wherein the annealing step is conducted at a temperature between 500 and 650 ° C for a time period greater than 200 seconds (4 to 24 hours) (page 6, paragraph [0110] and page 8, paragraph [0157]).

In re claim 12, Yamazaki discloses the method of claim 1 further comprising the step of providing a barrier layer (**FIGS. 6A-B: 604**) on the amorphous silicon film (**FIGS. 6A-B: 603**) wherein the barrier layer includes a window (**FIGS. 6A-B: 605**) therein for the introduction of the catalyst to the amorphous silicon film (page 8, paragraph [0156]).

In re claim 21, Yamazaki discloses wherein the metal catalyst is chosen from the group consisting of nickel, cobalt, and palladium, and germanium (page 6, paragraph [0109]).

2. Claim 22 is rejected under 35 U.S.C. 102(e) as being anticipated by Yamazaki et al. (U.S. Pub. 2002/0207502).

In re claim 22, Yamazaki discloses a method of fabricating a polysilicon film, comprising the steps of: providing a substrate (**FIGS. 5A-B: 501 and FIGS. 6A-B: 601**); depositing an amorphous silicon film (**FIGS. 5A-B: 503 and FIGS. 6A-B: 603**) on the substrate by the process of physical vapor deposition (sputtering) (page 6, paragraph [0107] and page 8, paragraph [0156]); after deposition of the amorphous silicon film, depositing a metal catalyst (**FIGS. 5A-B: 504 and FIGS. 6A-B: 606**) on selected regions of the amorphous silicon film (page 6, paragraph [0108] and page 8, paragraph [0156]); and annealing the amorphous silicon film and the metal catalyst film to form a crystallized silicon film by pure metal induced crystallization in the selected regions (page 6, paragraph [0110] and pages 8 and 9, paragraph [0157]).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 5, 6, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. (U.S. Pub. 2002/0207502) as applied to claims 1-4, 7, 12, and 21 above, and further in view of Venkatesan et al. (U.S. Patent 5,371,382).

In re claims 5 and 6, Yamazaki does not explicitly disclose wherein the amorphous silicon film is deposited using Argon as a sputtering gas.

Venkatesan discloses a method in which an amorphous silicon film is deposited by sputtering using Argon as the sputtering gas (col. 6, lines 5-17). It would have been

obvious to one of ordinary skill in the art of making semiconductor devices to combine the teaching of Yamazaki and Venkatesan to enable the amorphous silicon film of Yamazaki to be formed and furthermore to obtain a stable high temperature rectifying contact on diamond (col. 2, lines 14-16).

In re claims 5, 6, and 8, there is no evidence indicating that the ranges of the Argon content in the amorphous silicon film and in the crystallized region after the annealing step, and the thickness of the crystallization growth front length produces in the annealing step are critical and it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP § 2144.05. Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising there from. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

4. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. (U.S. Pub. 2002/0207502).

In re claim 20, Yamazaki discloses a method of fabricating a polysilicon film, comprising the steps of: providing a substrate (**FIGS. 5A-B: 501 and FIGS. 6A-B: 601**); depositing an amorphous silicon film (**FIGS. 5A-B: 503 and FIGS. 6A-B: 603**) on the substrate by the process of physical vapor deposition (sputtering) (page 6, paragraph [0107] and page 8, paragraph [0156]); in a separate step from the deposition of the

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amorphous silicon film, depositing a metal catalyst film (**FIGS. 5A-B: 504 and FIGS. 6A-B: 606**) on the amorphous silicon film (page 6, paragraph [0108] and page 8, paragraph [0156]); and annealing the amorphous silicon film and the metal catalyst film to form a crystallized silicon film by pure metal induced crystallization (page 6, paragraph [0110] and pages 8 and 9, paragraph [0157]).

Yamazaki discloses wherein the annealing step is conducted at a temperature between 500 and 650 ° C for a time period greater than 200 seconds (4 to 24 hours) (page 6, paragraph [0110] and page 8, paragraph 0157)) but does not explicitly disclose wherein the annealing step is conducted at a temperature less than 800 seconds, however, there is no evidence indicating that the annealing temperature and time duration are critical and it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation.

Response to Amendment

Response to Arguments

5. Applicant's arguments with respect to claims 1-8, 12, and 20-22 have been considered but are moot in view of the new ground(s) of rejection.
6. In response to Applicants' argument that Zhang neither teaches or suggest a two step process: "depositing an amorphous silicon film on the substrate by the process of physical vapor deposition; after deposition of the amorphous silicon film, depositing a metal catalyst film on selected regions of the amorphous silicon film" as recited in the independent claims, examiner respectfully disagree, since Applicant's amendment

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necessitated the new ground(s) of rejection, Applicants are directed to pages 2 and 4, 2nd paragraph, presented in this Office Action where the newly discovered reference, Yamazaki et al. (U.S. Pub. 2002/0207502) discloses a method of fabricating a polysilicon film, comprising the steps of: providing a substrate (FIGS. 5A-B: 501 and FIGS. 6A-B: 601); depositing an amorphous silicon film ((FIGS. 5A-B: 503 and FIGS. 6A-B: 603) on the substrate by the process of physical vapor deposition (sputtering) (page 6, paragraph [0107] and page 8, paragraph [0156]); introducing a metal catalyst (FIGS. 5A-B: 504 and FIGS. 6A-B: 606) to the previously deposited amorphous silicon film; and annealing the amorphous silicon film to form a crystallized region by pure metal induced crystallization (page 6, paragraph [0110] and pages 8 and 9, paragraph [0157]).

For these reasons, examiner holds the rejection proper.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the

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advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D Nguyen whose telephone number is (703) 306-0210. The examiner can normally be reached on Monday-Friday (8:00 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

K.N.
December 31, 2003



W. David Coleman
Primary Examiner